

RECORDS AND DESCRIPTIONS OF THE REPTILES AND BATRACHIANS OF THE COLLECTION.

(Plate XIV, text figures 14-16.)

By PAUL A. METHUEN and JOHN HEWITT.

Some general remarks on the colour of species dealt with in this paper in relation to the environment.

THE phenomenon rightly or wrongly termed "Protective Colouration" is well exhibited by many species of reptiles in Great Namaqualand. One of the best instances noticed is that of the viper *Bitis caudalis*, one of the commonest snakes of the country; the distinctive markings and contrasting colours only serve the more effectively to conceal this sluggish creature in its natural surroundings, so much so that the traveller runs a risk of treading on the snake before noticing its presence. The great variation in intensity of colour shown amongst different individuals of this species was found to be correlated with the changing aspects of the surroundings. This species was easily captured and natives who were well aware of its poisonous properties collected living specimens without any hesitation.

All the species of *Eremias*, (with the exception of *E. lugubris*), the single species of *Scapteira* and of *Nucras* which were taken resemble their surroundings: at the same time it may be worth recording that *Eremias lugubris*, which is rather conspicuous in its natural haunts, is a very difficult lizard to catch partly because it conceals itself in thorn bushes when approached, and partly because it is very fleet, and clever in avoiding its would-be capturer.

The "whip snake" *Psammodphis notostictus* has also the power of concealing itself very effectively. Its markings and whip-like body render it an inconspicuous object among the bushes on or under which (for it is not strictly a tree-climber) it was always found. When chased it will move from one bush to another with great rapidity, and it is exceedingly difficult to locate it on these occasions, for the creature ceases to move directly it is ensconced in a bush.

The species of *Agama* are particularly interesting in that whereas under certain circumstances they are protectively coloured to a great degree, the same individuals may at other times be ranked among the most conspicuous of natural objects. *Agama atra* which was invariably found in rocky or stony places was found usually to harmonize well with its surroundings, the colours of various individuals varying somewhat according to these surroundings. A striking case was noticed in the Little Karas Mountains when a ♀ specimen, as black as the stones among which it was taken, lost some of its black colour after capture and became brown. The gaudily coloured ♂♂ on the other hand are most conspicuous objects in their natural surroundings, at all events to the human observer.

When undisturbed they perch on the rocks and display their splendid colours in the bright blue head and neck, and in the yellow back.

Agama aculeata occurred in great abundance on the sandy plains: here it was quite an inconspicuous animal, its colours harmonizing with those of the ground: it was also found on bushes, but the arboreal individuals were usually characterised by the most magnificent colours which rendered these creatures as conspicuous as large flowers.*

We are inclined to suspect that these gay colours are only assumed during the breeding season, and that at other times all the individuals both ♂ and ♀ are protectively coloured. The preference for arboreal life exhibited by *Agama aculeata* when in breeding costume may perhaps be due to the fact that a conspicuous lizard is safer in trees than on open ground: it is also probable that the colour of the vegetation has a stimulating effect on that of the lizard. It is scarcely possible to believe that the gayly coloured arboreal individuals of *A. aculeata* and the equally gorgeous rock frequenting ones of *A. atra* are in any wise concealed from their enemies. Such individuals of *A. atra* are hard to catch and bite fiercely when molested: on the other hand protectively coloured ♀ specimens found on the ground are easily caught.

A few reptiles in Namaqualand would seem to be under no circumstances protectively coloured. A striking example of this type is found in the small lizard *Cordylosaurus trivittatus* which has a distinctive pattern of strongly contrasted colours of black and light buff and a bright blue tail: the latter part of the creature is extremely conspicuous, and is very easily broken when the animal is handled. In its natural haunts it is certainly one of the most brilliantly coloured animals of Namaqualand and its colours are obviously in direct contrast with those of its surroundings. This creature which is very swift may be seen running about in rocky places during the heat of the day. It may be that this species affords an example of warning colouration: but on this point there is no real evidence (see however page 140 footnote), and its alertness is decidedly against such an explanation of its striking colours. On the other hand its colouration may be epigamic though the sexes are alike: to this principle Professor Poulton (in lit.) refers the colouration of flamingoes.†

The black variety of the black-necked cobra, *Naja nigricollis*, is another example of a reptile which is not protectively coloured and which makes no attempt to conceal itself. In this case it is possible that both aposematic and epigamic influences have operated. ♂ and ♀ cobras often differ greatly in colour the ♂♂ being more conspicuous than the ♀♀: the specimen we took was a ♂.

* *Agama distanti*, which, like *A. aculeata*, is in all probability one of the geographical forms of *A. hispida* has according to observations made by Master B. Penfold and myself at Pretoria the power of changing its colours to some extent so as to match its surroundings. Master Penfold has written to me that "*A. distanti*, though the usual colour is sandy brown, can develop a dark brown or a light brown body with blue head or cheeks and an orange chest or a plain brown body with a few dark markings." A dark coloured specimen which I caught in the winter of this year near Pretoria on dark soil which it matched very closely, was placed upon a light grey rock which was here and there covered with an orange coloured lichen. After a short time the animal changed its colours, the body becoming light and the head and anterior parts of the body developing in places a chestnut brown colouration: the flanks also became lighter and were seen to be spotted with orange.—P. A. M.

† We wish here to express our thanks to Professor E. B. Poulton for his kindness in writing to us at length on the phenomena here alluded to.

At present we do not desire to draw any general conclusions with regard to the meaning of colours and patterns among the reptiles of Namaqualand. Experimental evidence and continued observations over a considerable time will no doubt solve some of the questions at issue. For the present we are unable to form any opinion as to whether the phenomena here alluded to as "Protective Colouration" is brought about by the agency of natural selection or by some inherent condition or "state of things" in the organism itself acting in direct response to the physical environment.

Note on the localised Distribution of various species of Lizards found in the Karas Mountains and immediate neighbourhood.

The phenomenon here alluded to relates chiefly to the Lacertidae: three genera of this family were taken, namely, *Nucras*, *Scapteira*, and *Eremias*.

In the case of *Eremias* four species were found within a perimeter about a mile or less from Narudas Süd; at the same time these species were not all found living under precisely similar conditions. The four species found at this locality were *Eremias lugubris*, *E. lineo-ocellata pulchella*, *E. namaquensis*, and *E. inornata*: of these *E. pulchella* appeared to be the least exclusive in its preference for particular environment, though it was generally seen together with *E. inornata* on rocky or stony ground, especially in the heart of the mountains: *E. namaquensis* was invariably seen on the sandy plains and on the sandy stretches which lie at the foot of and here and there in the mountains, its habitat being in fact in marked contrast to that of *E. inornata*: although the two species were found within a few yards of each other, they were never actually taken together at the same spot; *E. lugubris* was only taken in the sandy beds of rivers, generally in company with *E. namaquensis*.

Now of this list the two species which are most closely allied are *E. namaquensis* and *E. inornata*: it is a noteworthy fact that whereas other two species of *Eremias*, not so closely related to each other as those two just mentioned, may live together under the same conditions, such is not the case with *E. namaquensis* and *E. inornata*. On this same trip another close ally of *E. namaquensis*, namely *E. undata*, was taken in the Namib Desert at Lüderitzbucht where the conditions are very much different from those in the Karas District, the rainfall at Lüderitzbucht being almost a negligible quantity whereas in the Karas District rain can usually be expected from December to February or March: further the vegetation is a good deal different in the two districts.

Again, whereas the four species of *Eremias* appeared to separate themselves more or less into their several environments, it may be noted that the single species of *Scapteira* was found under various conditions in different localities, namely on the sandy plains which separate the Little Karas from the Great Karas Mountains, and in the arid region of the Namib Desert.*

Among the Geckonidae six species were taken: *P. bibroni*, a very distinct species, was found to occur along with *P. purcelli* in the Great

* We must add that according to Werner (l. i. c.) *E. undata* has been found at Windhuk, Rehoboth, and at Aus: and *E. pulchella* at Lüderitzbucht.

Karas Mountains and with *P. punctatus*, at Quibis. Now *P. punctatus*, *P. purcelli*, and *P. mariquensis* are three closely related species, but no two of these were ever taken together. *P. punctatus* was found hiding under stones in the daytime in somewhat broken country: *P. purcelli* was invariably found in crevices of rocks at a fairly high elevation in the Great Karas Mountains: *P. mariquensis* of which only two specimens were taken was found at the foot of the eastern slopes of the same mountains in sandy soil.

Two species of *Agama* were found, rather closely related species—*A. atra* and *A. aculeata*—, and in this connection again it was noticed that *A. aculeata* was in the Karas District invariably taken in sandy parts, whereas *A. atra* preferred the rocky parts of the mountains.*

The two species of Zonuridae taken were found under precisely the same conditions as far as could be judged but not in precisely the same localities.

Among the five species of *Mabuia* which were taken it was noticed that the two which are most closely related, namely *M. trivittata* and *M. occidentalis*, did not occur together: the former was found on rocky ground, in one case at the height of 6000 feet, the latter in the sandy river bed on the western side of the Great Karas Mountains. *M. sulcata*, not closely related to either of these two was found under various environmental conditions, often occupying the same locality as *M. occidentalis* on the one hand, and as *M. trivittata* on the other hand.

Again the three species *M. sulcata*, *M. varia* and *M. trivittata* were found to occur together: but no two of these three species can be said to be closely related: *M. sulcata* and *M. varia* belong to the same group of the genus, but neither is so closely related to each other as either one is to *M. striata*, a species which was not taken on this expedition.

We may conclude by saying that we have not found any instance of two closely allied species occupying precisely the same environment in the same locality.† The facts seem to us to point to the supposition that the formation of closely allied species is only possible when the diverging stocks can in some way be separated from each other (so as to prevent interbreeding), this isolation being frequently brought about in all probability by differences in habits.

We do not wish to suggest however that all species are formed in this way though such may conceivably be the case: so far as one may judge from distribution data it seems possible that some species may have arisen without the aid of topographical or even habitual isolation.

* In August of this year I took a specimen of *Agama atra* and *A. distanti* together in the vicinity of Pretoria: both were found hiding under the same stone, and were probably hibernating. This is however the only case I have noticed, after numerous observations, of these two lizards occurring side by side. Further the habits of the two species are different. Thus *A. distanti* is usually found in the open veld, in flat country free of rocks: they live largely on termites into whose nests they frequently burrow: they are partly arboreal. *A. atra* on the other hand is found in the rocky hills: this species never, as far as I know, makes burrows but lives among the rocks, into the crevices of which it retires for concealment. The third species of *Agama* in the Transvaal, namely *A. atricollis*, is probably exclusively arboreal.—P. A. M.

† A partial exception to this rule was furnished by *Pachydaetylus bibroni* var. *laevigatus* which was found together with *P. bibroni* var. *typicus* (but see page 129).

BATRACHIA SALIENTIA.*AGLOSSA.*

Family PIPIDAE.

Genus XENOPUS, Wagl.

Bouleng. B. M. Cat. Batr. Sal. 1882, p. 456.

X. laevis, Daud.

Bouleng. l. c. : Hewitt and Power, Trans. Roy. Soc. S. Africa, III, 1913, p. 175.

14 examples from the Great Karas Mountains and District. Localities: 1373, 1374, Narudas Süd: 1375-1383, Narudas Nord (juveniles): 1384, Kraikluft (at 5000 feet): 1385, Baviaanspoort: 1386, in a spring at Groendoorn, Little Karas Mountains.

All these were taken in more or less permanent pools of water.

PHANEROGLOSSA FIRMISTERNIA.

Family ENGYSTOMATIDAE.

Sub-Family ENGYSTOMATINAE.

Genus PHRYNOMANTIS, Peters.

Bouleng., Cat. Batr. 1882. p. 172: Werner, Rept. Amph. Schultzes Reise, B. 4, L. I, 1910, p. 294.

Phrynomantis nasuta, sp. nov. (pl. XIV, fig. 2).

Description: habit stout: head very large and broad: head and body much flattened: snout acutely rounded, projecting well beyond the lower lip, almost one and a half times as long as diameter of orbit: nostril nearer the tip of the snout than the eye: inter-orbital space broader than the length of the upper eyelid. Tympanum visible, not very distinct, about half the diameter of orbit.

Fingers free, moderate, their tips slightly expanded, but hardly what could be termed triangular: the sub-articular tubercles fairly prominent: several distinct small tubercles below the metacarpals of the second third and fourth fingers: the first finger much shorter than the second which does not extend as far as the fourth. Toes short, one quarter to one third webbed, their distal extremities not expanded: the inner metatarsal tubercle is moderate in size but prominent, being in fact more or less shovel-shaped: there is no distinct outer tubercle but in addition to the subarticular tubercles which are fairly prominent there are several small tubercles on the palmar surface.

If the hind limb be carried forwards the tarso-metatarsal joint reaches just beyond the axilla but not beyond the shoulder: the fourth toe reaches a point about half way between the eye and the tip of the snout.

Skin smooth. On each side a fairly prominent gland in the coccygeal region just above the cloaca. A glandular fold passes from the eye over the tympanum and loses itself behind the shoulder: between the tympanum and the shoulder this fold is much swollen.

No cutaneous fold across the palate between the choanae. A cutaneous fold across the chest between the shoulders is present.

Colour: above dark chocolate brown, with reddish markings: below somewhat lighter, without the red markings.

One example taken in a pool at Kraikluft in the Great Karas Mountains at an altitude of 5000 feet. Length from tip of snout to vent 31 mm.: greatest breadth of head 11·5 mm., and of body 14 mm. Type, T. M. Cat. Batr. No. 1317, in the Transvaal Museum.

The comparatively long projecting snout, the rather small eye, the large broad head, the webbing of the feet, and the fact that the discs of the fingers are very little expanded are characters which would seem to distinguish this species from any known representative of the genus *Phrynomantis*. On the other hand it would seem to be related to *P. annectens*, Werner (l. c.) by the fact that the head and body are much depressed, that the interorbital space is broad, in the absence of a cutaneous fold across the palate, in the character of the inner metatarsal tubercle, in the length of the hind limb, and by the presence of a prominent fold on the side of the head.

Unfortunately the characters of *P. annectens* are not fully known, as the type specimen is almost certainly very juvenile. The identity of that species cannot be established until adult specimens are obtained from the same locality as that of the type.

Sub-Family DYSCOPHINAE.

Genus CACOSTERNUM, Blgr.

Bouleng., A. M. N. H. (5) XX, 1887, p. 51, and (7) XVII, p. 321.

C. boettgeri, Blgr.

Arthroleptis boettgeri, Bouleng., B. M. Cat. p. 118, Pl. XI, fig. 6.

C. boettgeri, Bouleng., Ann. S. A. Mus. V, 1910, p. 533; Hewitt, Rec. Albany Mus. II, p. 215.

C. nanum, Bouleng., A. N. M. H. (5) XX, 1887, p. 51.

C. namaquense, Werner, Rept. Amph. Schultzes Reise, 1910, p. 293, fig.

55 specimens from more or less permanent pools in the Great Karas Mountains. Localities: 1318-1358, Kraikluft, altitude 5000 to 5300 feet: 1359, 1360, Sandmund: 1361-1372 (*neque* 1364), Narudas Süd.

In the same pools *Rana delalandi* and *Xenopus laevis* occurred, and in one case *Phrynomantis nasuta*.

At Kraikluft this little frog was observed to be a burrower, making its holes a few inches deep in the soft mud surrounding the pools; these holes were apparently used for retreat when occasion demanded. We may mention that at Prieska in March 1912 when the country was in a very parched condition this species was found hidden in cracks of the ground near ponds, sometimes at the depths of 12 to 18 inches.

During daytime the whereabouts of this little frog could be detected by the low, somewhat jarring or clicking croak which it would utter when approached.

In these specimens it is notable that the feet are distinctly webbed at the base, the webbing being easy to distinguish between the third and fourth digits.

Most of the examples are dark brown or olive above (in one case light brown), with fairly large dark spots arranged more or less regularly; no bright green specimens were seen. A white vertebral line is present in a few, in three or four of which there is also present a light line on each side starting on the back above the shoulder and losing itself about half way between the shoulder and the leg. Dorsally the skin is generally smooth, but in a few specimens there are small warts; in one specimen (1334) large elongate and smaller blister-like or warty excrescences are

scattered over the head and back in a more or less symmetrical way. Below white with or without grey or black spots which vary in size. As in *Phrynomantis* a pair of fairly prominent glands is found in the coccygeal region just above the vent.

Our largest specimen measures 26 mm. from snout to vent.

Family RANIDAE.

Sub-Family RANINAE.

Genus RANA, L.

Rana, Bouleng., B. M. Cat. p. 6.

Rana and *Pyxicephalus*, Nieden, Zool. Anz. 1908, p. 651.

Rana, Hewitt, Ann. Transv. Mus. III, 1911, p. 51.

R. delalandi, Tschudi.

Pyxicephalus delalandi, Tschudi, Class. Batr., p. 83. Bouleng., Ann. S. A. Mus., V, 1910 p. 528.

R. delalandi, Bouleng., Cat. Batr. Sal. p. 31.

11 adult specimens, besides juveniles and tadpoles from the Great Karas Mountains. Localities: 1300–1309, 1312, Kraikluft at 4800 to 5000 feet: 1310, 1311, 1313–1316, 1364, Narudas Süd.

This species was found breeding in pools which for the most part were formed in the river beds after a spate, and were likely to dry up after two or three months if not replenished. The metamorphosis of the tadpole seems to take place fairly rapidly; several tailless juveniles, 15 mm. from snout to vent, were taken; in other places tailed larvae, their fore-limbs not developed, up to 23 mm., were procured. It was noticed that in larger and deeper pools the tadpoles were large but not otherwise advanced: in shallower pools at higher elevations the tadpoles were smaller but much further advanced. A few of the adult specimens have the back quite smooth, but in the majority the back bears small warts. The largest specimen measures 47 mm. from snout to vent.

We have not employed the generic term *Pyxicephalus*, since we are of opinion that owing to the close relationship of *R. grayi* to *R. natalensis* and perhaps of *R. ruddi* to the *R. mascarenensis* group (in respect to the presence in ♂♂ of external vocal sacs) the separation of the *Pyxicephalus* from the *Rana* section proper leads to an unnatural arrangement.

SQUAMATA.

LACERTILIA.

Family GECKONIDAE.

Genus CHONDRODACTYLUS, Peters.

Chondrodactylus, Peters: Mon. Ber. Ac., 1870, p. 110. Bouleng.: B. M. Cat. Liz. I. p. 10: Ann. S. A. Mus. V, 1910, p. 456. Werner: Rept. Amph. Schultzes Reise, B. 4, L. I., 1910, p. 306. Hewitt: Ann. Trans. Mus., II, 1910, p. 77, 82, 85.

Chondrodactylus angulifer, Peters.

C. angulifer, Pet.: auct. and loc. cit.

C. weiri, Blgr., P. Z. S., 1887, p. 339.

22 examples from the Great Karas Mountains and immediate neighbourhood,

ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA

The following table shows the results in part for the collection in the laboratory maintained by the Department in the Department of Agriculture.

No.	Plant material	Approximate quantity	No. of insects reared from material	No. of insects reared from material	No. of insects reared from material
10001	Net material killed	1/2 lb.	2	2	2
10002	Material in collection	1/2 lb.	2	2	2
10003	Material in collection	1/2 lb.	2	2	2
10004	Material in collection	1/2 lb.	2	2	2
10005	Material in collection	1/2 lb.	2	2	2
10006	Material in collection	1/2 lb.	2	2	2
10007	Material in collection	1/2 lb.	2	2	2
10008	Material in collection	1/2 lb.	2	2	2
10009	Material in collection	1/2 lb.	2	2	2
10010	Material in collection	1/2 lb.	2	2	2
10011	Material in collection	1/2 lb.	2	2	2
10012	Material in collection	1/2 lb.	2	2	2
10013	Material in collection	1/2 lb.	2	2	2
10014	Material in collection	1/2 lb.	2	2	2
10015	Material in collection	1/2 lb.	2	2	2
10016	Material in collection	1/2 lb.	2	2	2
10017	Material in collection	1/2 lb.	2	2	2
10018	Material in collection	1/2 lb.	2	2	2
10019	Material in collection	1/2 lb.	2	2	2
10020	Material in collection	1/2 lb.	2	2	2
10021	Material in collection	1/2 lb.	2	2	2
10022	Material in collection	1/2 lb.	2	2	2
10023	Material in collection	1/2 lb.	2	2	2
10024	Material in collection	1/2 lb.	2	2	2
10025	Material in collection	1/2 lb.	2	2	2
10026	Material in collection	1/2 lb.	2	2	2
10027	Material in collection	1/2 lb.	2	2	2
10028	Material in collection	1/2 lb.	2	2	2
10029	Material in collection	1/2 lb.	2	2	2
10030	Material in collection	1/2 lb.	2	2	2
10031	Material in collection	1/2 lb.	2	2	2
10032	Material in collection	1/2 lb.	2	2	2
10033	Material in collection	1/2 lb.	2	2	2
10034	Material in collection	1/2 lb.	2	2	2
10035	Material in collection	1/2 lb.	2	2	2
10036	Material in collection	1/2 lb.	2	2	2
10037	Material in collection	1/2 lb.	2	2	2
10038	Material in collection	1/2 lb.	2	2	2
10039	Material in collection	1/2 lb.	2	2	2
10040	Material in collection	1/2 lb.	2	2	2

Department of Agriculture, Washington, D. C., report on the results of the collection in the laboratory maintained by the Department in the Department of Agriculture.

The results of the collection in the laboratory maintained by the Department in the Department of Agriculture are shown in the following table. The collection was made in the laboratory maintained by the Department in the Department of Agriculture. The results of the collection in the laboratory maintained by the Department in the Department of Agriculture are shown in the following table.

noise: however they do not distinguish between the two species, calling them both “//on //on” (the sign // standing for a click, similar to that which most riders make when trying to persuade their mount to improve its pace). Where *Chondrodactylus* was found, there also *Ptenopus* occurred. But the latter was dug from burrows of a dissimilar nature, generally inhabited as well by a common Namaqualand rat, *Desmodillus auricularis*.

After rains they are said to leave their burrows, and may then be seen in thousands over the plains.

In spirit this animal loses its natural colouring rapidly. In life it is brownish or greenish with black angular markings across the back: just behind every angular marking on each side is a conspicuous white spot; below pure white. In the young the colouring is more contrasted than in the adult: the angular markings are darker, and between these are lemon-yellow bars, the rest of the back being brown and the head darker: the proximal half of the tail is barred with brown and yellow, the distal half with dark brown and white.

Genus PTENOPUS, Gray.

Bouleng.: B. M. Cat. I, p. 15, and Ann. S. A. Mus. V, 1910, p. 456. Werner: Rept. Amph. Schultzes Reise, 1910, p. 306.

Ptenopus garrulus, Smith: auct. and loc. cit.

6 examples from the Great Karas Mountains and immediate neighbourhood, 3024–3029. Localities: Narudas Süd, Alt Wasserfall, and between Dassiefontein and Noakabel.

Colour of these specimens for the most part light chestnut brown, mottled with very light brown. One individual has darker brown markings edged with black. The throat is aureolin. Labials $\frac{8.9}{7.9}$.

Andrew Smith says of this species: “Inhabits sandy districts, in the interior of southern Africa, is gregarious, and lives in small, nearly perpendicular burrows; it seeks its food probably during the night, at least I have never seen more than its head above ground during the day” (two of our specimens were caught during the day in the open veld, but undoubtedly it is mainly nocturnal). “In the localities in which it occurs many individuals may be seen peeping from their hiding places any time during the day, each uttering a sharp sound, somewhat like *chick, chick*; and the number thus occupied is at times so great, and the noise so disagreeable as to cause the traveller to change his quarters.”

Three of our specimens were dug out from holes in the immediate neighbourhood of those occupied by *Chondrodactylus* on the sandy plains near Wasserfall.

Gen. nov. NARUDASIA.

Diagnosis: digits long and slender, not dilated, strongly clawed, rather feebly denticulated laterally but not fringed: inferiorly with a series of smooth transverse plates which in places, especially in the basal half of the digit, are somewhat enlarged and swollen into minute pads: palmar surfaces with small smooth convex scales. Lower surface of the body covered with comparatively large imbricate scales: upper surface with small round juxtaposed scales of slightly varying size, those on the upper surface of the head being polygonal. No gular shields. No anal nor femoral pores. Pupil vertical.

This genus is therefore very like *Homonota* of South America and *Stenodactylus* of Asia and North Africa, but is distinct from both through the nature of the infradigital scales.

N. festiva, sp. nov. (pl. XIV, fig. 1).

Description : head, body, and tail depressed : head rather long (in the figure it appears too short owing to foreshortening) : limbs well developed : tail rather long and tapering. Snout rather pointed, much longer than the diameter of the eye which is small : ear-opening small, more or less rotund, situated the same distance from the eye as the tip of the snout. Forehead between the eyes slightly concave. The rostral which is twice as broad as deep is cleft above. The nostril is pierced between two small nasal granules, naso-rostral, rostral, and the first labial. The naso-rostrals may or may not be separated. The symphysial as deep or not quite as deep as the adjoining labials, and narrower : it is rather more than twice as deep as broad. Labials $\frac{9.8}{7.6}$, usually $\frac{8}{6}$. The scales on the snout are larger than those on the back, and are about twice the size as those on the back of the head : the scales on the belly are rather more than twice as large as those on the back. The tail above has the scales about twice the size of those on the back, imbricate : each segment of the tail, indicated only by the dark cross bars, has about ten transverse series of scales : below the scales are larger and are arranged in irregular longitudinal series.

The colour is variable, but the markings are constant. Above, usually dark brown, sometimes tinged with violet, or a lighter chestnut-brown (in young olive-brown), with thin black zigzag transverse stripes : behind, in the corners of these vermiculations are white spots : the stripes are continued on the tail which is generally dirty yellow in colour. Below, light grey or dirty white.

18 examples at Narudas Süd, in crevices of rocks in the river bed at the foot of the Great Karas Mountains.

The specific name has reference to a characteristic habit: Dr. H. H. W. Pearson noticing this species at Narudas Süd described it to Mr. Methuen as "a ridiculous little beast sitting on a rock and waving its yellow tail in the air."

It is exceedingly swift in its movements.

Type, T. M. Cat. Rept. No. 3038, in the Transvaal Museum. 3031-3048.

Genus LYGODACTYLUS, Gray.

Bouleng., B. M. Cat. I, p. 158.

L. capensis, Smith.

Hemidactylus capensis, Smith, Ill. Rept., Pl. LXXV, fig. 3.

L. capensis, Bouleng., l. c., p. 160.

6 examples all taken on trees: 3049, 3050, from Wasserfall: 3051-3053, Narudas Süd: 3054, from Quibis. No. 3054 was found with its nest containing two eggs under the bark of an Acacia tree.

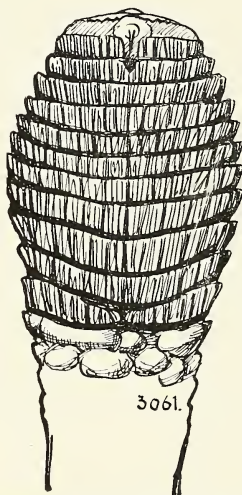
Genus PACHYDACTYLUS, Wiegman.

Pachydactylus, Wiegman. Herp. Mex. p. 19 : Bouleng., B. M. Cat. I, p. 200 : and Ann. S. A. Mus. V, 1910, p. 456, and 459.

Elasmodactylus, Bouleng., P. Z. S. 1894, p. 727.

According to the earlier descriptions relating to *Pachydactylus* and *Elasmodactylus* these two genera were separable through the absence of a

claw on the toes in the former and its presence in the latter. We have observed however that a minute claw is present in all species of *Pachydactylus* at our disposal, the arrangement being precisely as in *Elasmodactylus namaquensis*, Scat. (we have examined all the known species except *P. fasciatus*, *P. amoenus*, *P. serval*, and *P. weberi*). Mr. Boulenger (*vide* Ann. S. A. Mus. V, p. 456) has evidently observed the presence of claws on the toes in *Pachydactylus* but endeavours to maintain the generic distinction of *Elasmodactylus* by contrasting the degree of dilatation of the digits: thus he writes "digits strongly dilated" in *Elasmodactylus*, "digits more or less dilated" in *Pachydactylus*. We can only add that in our judgment *Pachydactylus bibroni* and "*Elasmodactylus*" *namaquensis* are precisely alike in this respect.



Text fig. 14. Toe of *Pachydactylus bibroni* var. *laevigatus*, from underside, with claw partially extended (diagrammatic): enlarged. The claw seems to be retained in a minute circular muscular pad: a small scale above this pad and below the "nail-like" scale protects the pad from above. The claw can only be seen when the distal extremity of the toe is extended.

We may mention that the claws are present only on the toes not on the fingers (*vide* text fig. 14).

P. namaquensis, Scater.

Elasmodactylus namaquensis, Scat., Ann. S. A. Mus., I, 1899, p. 109, Pl. V, fig. 2: Bouleng., id. V, 1910, p. 459.

2 examples at Kraikluft, at an altitude of 5000 feet: 3100, length 81 + 55 mm., tip of tail regenerated: 3101, length 75 + 82 mm. The skin of this Gecko is very loose, and is easily torn if the animal is roughly handled. Both specimens were taken in a deep ravine in crevices of rocks.

In neither specimen does the first labial enter the nostril: the rostral is considerably broader than deep: the naso-rostrals are separated by a small scale: the tail is distinctly annulated, each annulus including seven rows of scales dorsally, the transverse row separating two adjacent annuli including five or six enlarged scales: the ventral scales of the tail are much larger than the dorsal ones.

Type and co-type have been examined by us.

P. bibroni, Smith.

Tarentola bibronii, Smith, Ill., Rept. pl. L, fig. 1.

P. bibroni, Bouleng., Cat. Liz. I, p. 201: Ann. S. A. Mus. V, 1910, p. 460. Werner, Rept. Amph. Schultzes Reise, 1910, p. 308.

P. laevigatus, Fischer, Jahrb. Hamb. Wiss. Anst. V, 1888, p. 15, pl. II, fig. 3. Bouleng., Ann. S. A. Mus. I. c. p. 460: *var.*, Werner I. c. p. 309.

P. stellatus, Wern. *var.*, I. c. p. 309.

25 specimens from the Great Karas Mountains, and from Quibis. They were all found in the crevices of rocks.

The form *laevigatus* was taken at Kraikluft (elevation 5200 feet), at Narudas Süd, and between Kraikluft and Alt Wasserfall. The keeled forms (three specimens) were taken at Narudas Süd in precisely the same localities as *laevigatus*. These keeled forms appear to agree with Werner's variety *stellatus* but we do not think the form can be maintained as of varietal importance since it merges completely into *bibroni* proper.

P. montanus, sp. nov.

A single example from Lord Hill's Peak in the Great Karas Mountains, at an altitude of 7300 feet. Type, T. M. Cat. Rept. No. 3080 in the Transvaal Museum.

Related to *P. weberi*, Roux (Zool. Jahrb. 25, 1907, p. 408, Taf. 14, Fig. 4, 5): the differences therefrom are mentioned later.

Description: head rather large: head and body depressed. Snout one and a half times as long as the diameter of the orbit. Ear-opening elliptic nearly vertically oblique. Third toe bears inferiorly seven lamellae. Rostral, which is about twice as broad as deep, enters the nostril. The latter is pierced between two postnasals, naso-rostral, first labial, and rostral. Naso-rostrals in contact. The first labial is not pentagonal as described for *P. weberi*, but normal, i.e. four-sided. The symphyial is practically as deep as the adjoining labials, not as broad: it is a little more than twice as deep as broad. Labials $\frac{3}{3}$ on the one, $\frac{1}{9}$ on the other side.

The dorsal lepidosis is heterogeneous. The granules on the snout are enlarged and are twice or a little more than twice as large as the granules on the back. On the back mixed with the small granules are tubercles of moderate size somewhat flattened but keeled: these tubercles are quite separate from one another and arranged more or less in longitudinal lines: on the flanks however they are close together, less regularly arranged and less flattened. The tubercles on the back lose themselves gradually on the back of the head and behind the eyes. Further, there is a narrow mid-dorsal area on the back free of tubercles. Below, the scales are sub-imbriate, those in middle of belly slightly larger than those on the sides thereof.

The scutellation of the tail differs from that of *P. weberi*. The tail is the original one, the tip only (8 mm.) having been regenerated. It is divided into a number of segments, each segment carrying dorsally four to five transverse rows of scales: marking each segment is a single row of flattened moderately keeled tubercles.

Colour and markings in life: behind the head a dark horse-shoe band, and across the back a number of dark ferruginous broken bands, some forming large ocelli, others in the form of vermiculations: tail with broken cross-bars. Rest of upper surface purplish grey inclining on flanks and between eyes to olive: a lighter streak behind the upper lip and over the ear: the lips still lighter. A light yellowish streak from the anterior border of the eye to the snout. Anterior and posterior borders

of the eye yellow. Tail and limbs more of an olive colour than the body. Lower parts grey.

Length, 43.2 + 43.5 mm.

This species is the only known representative of the *capensis* group in which the rostral enters the nostril: it is also distinct from *uceberi* in the character and disposition of the dorsal tubercles, in the scutellation of the tail, and in the shape of the first labial.

Two specimens were seen: they were occupying crevices in the rocks on the steep sides of the mountain.

P. mariquensis, Smith.

P. mariquensis, Smith: Ill., Rept., App. p. 3: Bouleng., Cat. Liz. p. 207, pl. XVI, fig. 6: Hewitt: Ann. Trans. Mus. II, 1910, p. 81, 87, and III, 1911, p. 45.

2 examples, one adult, the other half-grown, at Narudas Süd: 3097, 3098. This species was found under stones in sandy places.

The naso-rostrals are widely separated: the dorsal scales are about as large as or a trifle larger than those on the belly.

P. punctatus, Pet.

P. punctatus, Peters, Mon. Berl. Ac. 1854, p. 615, and Reise Moss. III, p. 26, pl. V, fig. 2: Bouleng., B. M. Cat. p. 206, and Ann. S. A. Mus. V, 1910, p. 462: Hewitt, Ann. Natal Mus. II, 1913, p. 483.

7 examples mostly from Quibis. Localities: 3081-3085, from Quibis; 3086, Nakeis (mine, Klein Karas); 3087, Kraikluft, at 5200 feet.

On comparing the series with typical specimens of this species from Bechuanaland (Serowe) and from Rhodesia (Bulawayo Museum), we find that our Namaqualand form differs somewhat therefrom: but we do not consider these differences to be of specific importance.

The profile of the head is rather more like that of *ocellatus* than of *punctatus*: the eye is a trifle larger and the rostral broader than in typical *punctatus*.

In our specimens the head and snout are convex, a slight concavity existing between the eyes; the eye is fairly large; the snout may be rounded as in *ocellatus*, or more or less pointed as in typical *punctatus*; it may be as long as or slightly longer than the orbit. The rostral which is separated from the nostril is nearly or fully twice as broad as deep. The naso-rostrals are separated in four specimens, in contact in three. Labials $\frac{9.7}{5.6}$ (individually $\frac{8.7}{6.7}, \frac{7.7}{5.5}, \frac{8.8}{6.7}, \frac{7.8}{6.5}, \frac{9.7}{7.5}$). The scales on the tail are twice as large as the dorsals: the latter are about the same size as or a little smaller than those on the snout. The ventral scales are only slightly larger than the dorsals, whereas in typical *punctatus* from Serowe and from Rhodesia (Bulawayo Museum) the difference in size between the dorsals and ventrals is more pronounced. Symphyial deeper than the adjoining labials, about twice as deep as broad. Ear opening generally rotund, sometimes elliptical.

We consider that these specimens represent a form intermediate between *punctatus* and *ocellatus*, on account of the large size of the scales on the snout, and in view of the other characters our individuals possess, as mentioned above.

On the other hand they appear to be very closely allied to Werner's *P. brunthaleri* from Bulawayo which has been lately described.*

* Forschungsreise nach Deutsch-Ost-Africa und Süd Afrika (J. Brunthaller). (I) Reptilien und Amphibien von Dr. Prof. F. Werner, (1913) Wien.

From this species however our form may differ in the comparative lengths of the eye and snout. Werner in his description of *P. brunnthaleri* states that the scales on the back and on the tail are distinctly imbricated ("deutlich geschieldelten"): this is also the case in our Namaqualand specimens of *P. punctatus*, though it would be more correct to state that the scales on the back and posterior part of the neck are sub-imbricate. We are not therefore using this last mentioned character in our key. It is unfortunate that no mention is made of the scales on the snout in the description of *P. brunnthaleri*, for this seems to us to be a character of considerable importance in separating some of the small species of *Pachydactylus* which possess homogeneous dorsal lepidosis. Werner also attaches importance to the position of the nostril in his new species: we find however in our Namaqualand specimens of *P. punctatus* that the first labial may be distinctly separated from the nostril or may very closely approach it.

We think it probable that *P. brunnthaleri* will prove to be the same as *P. punctatus*.

The markings are very variable: generally reddish-brown with darker or lighter (or both) variations dorsally. Light, immaculate below. Tail fairly long, thin, and tapering. The largest specimen measures 36 mm. from snout to vent.

Found hiding under stones during the daytime.

P. purcelli, Blgr.

P. purcelli, Bouleng., Ann. S. A. Mus. V, 1910, p. 494.

P. pardus, Sternfeld, Mitt. Zool. Mus. Berlin, V, 3, p. 398.

11 examples from the Great Karas Mountains. Localities: 3088, Wasserfall; 3089-3096, Kraikluft, at an altitude of 5200 feet, in crevices of rocks; 3099, Narudas Süd; 3102, 3103, between Kraikluft and Alt Wasserfall.

There can be little doubt but that this Karasberg species is the same as that described by Sternfeld from Warmbad under the name of *P. pardus*, and after carefully comparing our series with the types of *P. purcelli* Blgr. we are compelled to regard the two as specifically identical though some minor differences of structure do exist between our specimens and the types of *purcelli*. When compared with *P. purcelli* the Karasberg specimens have (1) the granules on the snout a trifle smaller, (2) the snout not so depressed and the head somewhat narrower posteriorly, (3) the eye just a trifle larger.

Sternfeld distinguishes his species from that of Boulenger in (1) the shape of the ear-opening which is round and larger than in *purcelli*: in the types of *purcelli* this structure is oval: (2) in the longer snout, and (3) in the colour. With reference to the length of the snout, however, we may remark that there can be little difference between the snout which is "one and two-thirds as long as the diameter of the eye" (*pardus*), and the snout which is "a little longer than the diameter of the orbit" (*purcelli*).

After careful examination of our specimens we have concluded that Sternfeld has composed the diagnosis of his species from unimportant characters which are subject to much variation. Thus the ear-opening in our specimens may be almost horizontally elliptic or nearly round, and may vary in actual size. The colour and the markings are also variable.

The Karasberg form of *P. purcelli*, Blgr. may be described as follows: head depressed: snout a little longer than the orbit; ear-opening an

oblique or almost horizontal slit, or subrotund, or of any form intermediate between these two. The rostral which is not quite twice as broad as deep enters the nostril. The symphysial may be a little larger or a little smaller than the adjoining labials: it is about twice as deep as broad. Labials $\frac{8-11}{8-10}$. Naso-rostrals in contact. The ventral scales are flat, sub-imbricate, and larger than the dorsals: the granules on the snout are enlarged, being about as large as or a trifle larger than the granules on the middle of the back. The tail is annulate above, a single transverse series of about six small tubercles occurring at regular intervals above, those at the sides being largest and all being separated by scales: each annulus comprises about six rows of scales (this character has not been recorded in *P. pardus*). The scales on the tail above and below are larger than those on the body.

The markings in the adults are variable, but in the young they seem to be fairly constant. Thus in the adult stage the head back and flanks are generally of a lightish brown colour on which are imposed dark



Text fig. 15. Figures illustrating the markings in adult, half-grown, and embryo specimens of *Pachydaetylus purcelli*, from the Great Karas Mountains.

irregular blotches: these tend to coalesce on the back, to the extent of forming irregular vermiculations or transverse or oblique bars. From the nostril to the eye and thence over the ear passes a dark streak which in the very young tends to meet its fellow behind the head.

In the embryo just before hatching or in the very young stage there are dorsally five light transverse bars which have irregular dark edges.

This variation in the markings is made evident in the accompanying list (*vide* also text fig. 15).

3088. The dark markings take the form of small blotches which tend to coalesce and form irregular cross-bars on the back. The ear-opening is subrotund. The tail which has been regenerated is devoid of enlarged tubercles.

3091. The dark markings some of which enclose a light centre take the form of irregular blotches: they are smallest on the sides. Ear-opening a small oblique slit. Length 37.5 + 39 mm.

3092. The dark markings dorsally and on flanks coalesce more than in 3091. Length 38+? mm. (tail imperfect).

3093. The dark blotches are normal and rather large: there is not much coalescence. Length 41·5+23+10 mm. (regenerated part of tail).

3094. The dark markings owing to coalescence are almost in the form of transverse vermiculations.

3102. The dark markings are very irregular: on the back they take the form of large oblique or transverse bars. Ear-opening an oblique nearly horizontal slit. Length 39+? mm. (tail imperfect).

3103. Dark markings in form of rather small irregular blotches which tend to coalesce on the back. The head is flatter than in others. Ear-opening an oblique slit.

3096. The dark markings in the form of irregular transverse broken vermiculations. Ear-opening subrotund, oblique. Transverse lamellae under the third toe five in number. Length from snout to vent 24·5 mm.

3090, 3095. Both taken from eggs. The dark streak through the eye is continued behind the head. A light region succeeds this streak, and then a thin dark band. Between this region and the base of the tail are four light transverse bars with dark edges. Elsewhere dorsally and on the sides are black granular markings.

3099 calls for some notice. It was found on sandy soil and in its habitat, therefore, differed from the rest. The specimen is a half-grown individual, its length being 27·5+33 mm. The head which is egg-shaped, is much narrower than in the others: the granules on the snout are considerably larger than those on the back: the snout is a trifle longer and more pointed than in the case of our other specimens: under the third toe are six lamellae: the ear-opening is subrotund, oblique: a dark streak passes from the snout through the eye to a point above the ear-opening: the general colouring above and below is light straw, with black spots and flecks above: the markings would appear to be similar to those of *P. serval*, Werner. From *P. serval* however, it is quite distinct in the size of the eye, in the size of the granules on the snout, and above all in the nostril character.

Through the kindness of the Director of the South African Museum, Dr. L. Péringuey, we have been able to examine the types of *P. purcelli*.

We have considered it expedient to draw up a Key to the genus *Pachydaetylus*.

KEY TO THE GENUS *Pachydaetylus*.

1. Dorsal lepidosis homogeneous, none of the scales being enlarged into tubercles.
 - A. Rostral bordering on the nostril..... 1. *P. purcelli*, Blgr.
 - B. Rostral not bordering on the nostril.
 - a. Three subdigital lamellae under the third toe.
 - Naso-rostrals in contact: dorsal scales not smaller than ventrals..... 2. *P. mariquensis*, Smith.
 - b. More than three subdigital lamellae.
 - Aa. Scales on snout three or four times as large as those on back of head.

- Rostral shield about twice as broad as deep: dorsal scales much smaller than ventrals: 4 or 5 subdigital lamellae: snout at the most one and one-third as long as diameter of orbit.....
3. *P. punctatus*, Pet.
- Ab.* Scales on snout? Like *P. punctatus*, except that snout is one and three-quarters as long as diameter of eye.....
4. *P. brunnthaleri*, Wern.*
- Ac.* Scales on snout not much bigger than those on back of head.
- i. 4 to 5 subdigital lamellae: rostral shield not or only slightly broader than deep: naso-rostrals usually separated: snout a little longer than the diameter of eye.....
5. *P. ocellatus*, Cuv.
- ii. 5 to 6 subdigital lamellae: naso-rostrals separated: snout one and a half times the diameter of eye.....
6. *P. amoenus*, Wern.
- iii. 6 subdigital lamellae: naso-rostrals in contact: eye small, the snout being one and three-quarters times the diameter of eye.....
7. *P. serval*, Wern.
2. Dorsal lepidosis heterogeneous, some of the scales being enlarged into tubercles.
- A.* Tubercles small, distinguished from the granules only by their larger size, sometimes conical.
- 3 or 4 subdigital lamellae: naso-rostrals widely separated: tibia with conical tubercles.....
8. *P. maculatus*, Gray.
- B.* Tubercles larger than in the preceding species, conical, subconical, keeled, or smooth.
- a.* Scales on the head not very finely granular.
- Aa.* Ventral scales granular, subconical.
- 4 to 5 subdigital lamellae: naso-rostrals separated: dorsal tubercles large, conical, spinose
9. *P. rugosus*, Smith.
- Ab.* Ventral scales quite smooth and flat, imbricate.
- i. 4 to 9 subdigital lamellae (species of moderate size): scales on middle of belly moderate, only a little smaller than those on sides of belly.

* For remarks on this species see page 130.

- α. Nostril not bounded either by rostral or by first labial..... *P. capensis*, Smith* and its
 † Scales on snout and on greater part of head large, smooth, and almost flat: scales on back subconical, weakly keeled..... 10. *P. capensis* var. *o'shaughnessi*, Blgr.
 †† Scales on snout and on greater part of head keeled, or at any rate not quite smooth and flat.
 * Dorsal tubercles very strongly keeled: 4 to 5 subdigital lamellae..... 11. *P. capensis* var. *formosus*, [Smith.
 ** Dorsal tubercles moderately keeled: 5 to 6 subdigital lamellae..... 12. *P. capensis* var. nov. [*typicus*.
 *** Dorsal tubercles large, trihedral: 6 to 9 subdigital lamellae..... 13. *P. capensis* var. *fasciatus*, [Blgr.
 β. Rostral and first labial entering the nostril.
 First labial four-sided: 7 subdigital lamellae..... 14. *P. montanus*, sp. nov.
 γ. First labial, but not the rostral, entering the nostril.
 First labial pentagonal: 5 to 6 lamellae 15. *P. weberi*, Roux.
 ii. About 10 to 12 subdigital lamellae (species of large size): scales on middle of belly small, considerably smaller than on sides of belly..... *P. bibroni*, Smith and its var.
 α. Dorsal tubercles smooth..... 16. *P. bibroni* var. *laevigatus*, [Fisch.
 β. Dorsal tubercles strongly keeled..... 17. *P. bibroni* var. nov. [*typicus*, (Werner [part).
 b. Scales on head very finely granular. [part).
 About 12 subdigital lamellae: dorsal tubercles flat, quite smooth, and of unequal size: rostral entering the nostril..... 18. *P. namaquensis*, Sclat.

Family AGAMIDAE.

Genus AGAMA, Daud.

Bouleng., B. M. Cat. 1, p. 335.

A. atra, Daud.*A. atra*, Daud. Hist. Rept. III, p. 349: Bouleng., B. M. Cat., I, p. 352: Ann. S. A. Mus. V, 1910, p. 465.*A. micropholis*, Matschie, Zool. Jahrb., Syst. V, 1890, p. 115.*A. microterolepis*, Bouleng., A. M. N. H. (6) XVII, 1896, p. 22.*A. holubi*, Bocage, J. Sc. Lisbon. (2) IV, 1896, p. 115.

17 examples from various localities. 3111, 3123, 3144, from Aus: 3115, Lüderitzbucht: 3113, 3114, 3116, 3118, 3120-3122, 3128, 3134,

* *P. affinis*, Blgr. and *P. leopardinus*, Sternf. seem to be synonyms of this species.

3140, 3143, in the Great Karas Mountains up to 6200 feet : 3119, in the Little Karas Mountains, between Groendoorn and Wasserfall : 3117, Quibis.

Juvenile specimens in our series usually exhibit heterogeneous dorsal scaling and very young specimens are not easily distinguished from *A. aculeata*.

A. aculeata, Merrem.

A. aculeata, Merrem. Tent. Syst. Amph. p. 53 : Bouleng. B. M. Cat. I, p. 351 : Hewitt & Power, Trans. R. S. S. A. III, 1913, p. 151.

24 examples : localities, 3108, 3124, Quibis : 3105-3107, 3125, 3127, 3129, 3133, 3135, 3137, 3141, 3145, from the sandy plains near Wasserfall : 3109, 3112, 3132, 3136, 3138, 3142, in the Great Karas Mountains : 3110, 3131, 3139, Groendoorn : 3126, 3130, Narudas Süd.

Most of these specimens may be described as fairly typical ; they exhibit much variation with regard to the relative proportion of the toes, as may be seen from the list below. Four specimens are noteworthy owing to the fact that the dorsal crest is practically obsolete on the back : moreover the enlarged dorsal tubercles are not numerous and are arranged in an irregular fashion such as is often met with in *A. atra* : these might be confused with the latter species from which they are distinct, however, in the length of the toes. We may mention that Rhodesian examples of *A. aculeata* also lack the dorsal crest and they differ further from the typical form in possessing shorter toes, the third being longer than the fourth.

It was noticed that this species was to a great extent arboreal in its habits : it prefers sandy soil for its habitat, whereas *A. atra* was found in rocky country.

We note the following characters in our series :

Toes and fingers slender. Ventral scales smooth, without spines. 3rd and 4th fingers subequal.

3127♂.	Fifth toe not quite as far as first* :	Fourth a little longer than third.
3131♂.	" "	" : " equal to "
3125♀.	" a trifle beyond	" : " longer than "
3130♀.	" as far as	" : " shorter than "
3124♀ juv.	Fifth nearly as far as	" : " a little longer than "
3126♀.	Fifth toe not quite as far as	" : " longer than "
3133♀ juv.	" "	" : " " "
3106♂.	Fifth toe a trifle beyond	" : " " "
3105♂.	" toe as far as	" : " a trifle longer than "
3107♀.	" toe not quite as far as	" : " longer than "
3110♀.	" "	" : " " "
3109♂.	" "	" : " " "
3138♀.	" as far as	" : " a trifle longer than "
3136.	" not quite as far as	" : " " "
3135♀.	" "	" : " " "
3145♂.	" as far as	" : " longer than "
3129♀.	" not quite as far as	" : " " "
3137♂.	" "	" : " a trifle longer than "
3139♀ juv.	Fifth not quite as far as	" : " " "
3141♀.	Fifth as far as	" : " " "

* By this is meant that the claw of the fifth toe does not reach an imaginary line passing through the claw of the first toe and drawn transversely to the axis of the limb.

Family ZONURIDAE.

Genus ZONURUS, Merrem.

Bouleng., B. M. Cat. II, p. 252.

Z. polyzonus, Smith.

Cordylus polyzonus, Smith, Mag. N. H. (2) II, 1838, p. 34: Ill. Rept. Pl. XXVIII, fig. 1, and XXX, fig. 7.

Z. polyzonus, Bouleng., l. c. p. 257: Hewitt and Power, Trans. R. S. S. A. III, p. 154.

12 examples from Aus and the Great Karas Mountains.

The largest specimen measures 120 + 93 mm. (tail regenerated) from Aus, 3150: another specimen taken between Kraikluft and Wasserfall measures 102 + 118 mm., 3149. Other localities: 3146, 3147, 3152, 3154–3156, Kraikluft, at 5200 feet: 3148 (102 + 130 mm.), between Sandmund and Kraikluft: 3151, 3157, between Kraikluft and Alt Wasserfall.

Our specimens were found in the crevices of rocks. The species occurs frequently in the neighbourhood of human dwellings.

Z. namaquensis, sp. nov.

11 examples from the Great Karas Mountains. Localities: on the top of a mountain at about 6200 feet, near Wasserfall, 3161 and 3168: 3166, Sandmund: 3158–3160 (3160, juvenile), 3162–3165, and 3167, at Narudas Süd, in the crevices of rocks in the river bed.

Related to *Z. pustulatus*, Pet., but in the character of the nostril resembling *Z. cataphractus*, Boie.

Description: head and body much depressed: head expanded, more or less triangular in shape, and a trifle longer than broad: temporal spines moderately or even poorly developed: scutes of the head rugose and ribbed: nostril facing laterally or laterally and upwards in a single nasal, which is large, much swollen, and tubular: nasals usually in contact—the suture so formed being short—sometimes separated by a small scale. Fronto-nasal large, not reaching the rostral. Labials not entering the eye: lower eyelid opaque.

Dorsal scales usually in 28 transverse series (in one specimen only 24, and in a juvenile individual as many as 32). The dorsal scales are moderately or even weakly keeled, much more strongly so and spinose at the sides: those on the sides of the neck particularly spinose. This dorsal scaling is sharply marked off at the sides: along the flanks is a narrow area covered with smooth small or very small almost granular scales which pass gradually into the ventrals. The second, third, and sometimes the fourth transverse row of scales immediately behind the occiput a little longer than the succeeding ones: those over the lumbar region the shortest. Ventral scales in 18 longitudinal series, those in the middle of the belly including about 14 scales. Anterior gulars smooth not granular. Caudal scales strongly keeled and spinose throughout, the spines longest laterally: about 26 to 30 whorls of scales on the tail.

Colour: lighter or darker chestnut brown above, with dark brown or black mottlings: head darker than the rest of the body; below generally a light muddy brown colour.

Measurements: length 81.4 + 89 mm.: length of head 21 mm., breadth 18 mm.

Type, T. M. Cat. Rept. No. 3163, in the Transvaal Museum.

Family LACERTIDAE.

Genus EREMIAS, Wiegman.

Boulenger, B. M. Cat. III, p. 80, and Ann. S. A. Mus. V, 1910, p. 473.

E. lugubris, Smith.

E. lugubris, Smith, Ill. Rept. 1849, pl. XLVI, fig. 2, pl. XLVIII, fig. 5 : Boulenger, l. c. p. 84.

5 examples : 3173-3176 at Narudas Süd : 3177 at Wasserfall : all these specimens were found in sandy river beds.

In one specimen the anterior border of the ear is feebly denticulated. The largest specimen, in life, measured 214 mm., of which the tail was 156 mm.

This is a very handsome species : the colour in life is as follows :—dorsally the head is olive-brown, the body chestnut-brown crossed with ink-black stripes which are broadest posteriorly, and the flanks ink-black broken with white spots : a light brown medio-dorsal line is present : the dorso-lateral line is white but yellowish posteriorly : the back posteriorly becomes paler the contrasting colours giving the creature a jacketed appearance : forearms blackish-brown with round white spots : hind limbs fairly light brown with round black-edged very light brown spots : tail light olive-brown : a white line passes along the upper lip to the ear and above the shoulder, and is continued along the flanks where it is much broken : lower surfaces white (description taken from a specimen 185 mm. in total length).

E. namaquensis, D. B.

Boulenger, l. c. p. 91 : Werner, Rept. Amph. Schultzes Reise, p. 330.

17 examples in sandy places below the Great Karas Mountains. Localities : 3179, 3180, 3186-3192, 3195, in the neighbourhood of Wasserfall : 3181-3185, at Narudas Süd, 3193, 3194, between Groendoorn and Wasserfall.

E. inornata, Roux. (text fig. 16.)

E. inornata, Roux, Zool. Jahrb. Syst. XXV, 1907, p. 427, Pl. XV, figs. 1-3 : Hewitt, Ann. Trans. Mus. II, p. 109, and III, p. 48.

E. undata, part Boulenger : Ann. S. A. Mus., V, 1910, p. 477.

10 examples from the Great Karas Mountains and neighbourhood, and from Quibis. Localities : 3199-3022, Wasserfall : 3203, 3204, from Quibis : 3205, 3206, Narudas Süd : 3208, Kraikluft at 5000 feet : 3207, between Groendoorn and Wasserfall in the Little Karas Mountains. Occurring on stony or rocky ground it was often taken along with *E. pulchella* but never with *E. namaquensis*.

The scaling of the lower eyelid is variable : the transparent disc, usually with four or five scales, may have the upper two so much developed at the expense of the others that a two-scaled condition is thereby approached, but not actually attained in our series : or on the other hand the two upper scales may themselves be divided. (*Vide* text fig. 16.)

Boulenger in 1910 (l. c.) considered this species to be the same as *undata* : with this decision we do not agree, as we can recognize several points of difference between the two species, namely :—(1) that the anterior border of the ear in *inornata* is not denticulated as is the case in *undata* : (2) that an elongated crescent-shaped scale on the supero-anterior border of the ear is invariably present in *inornata*, whereas it

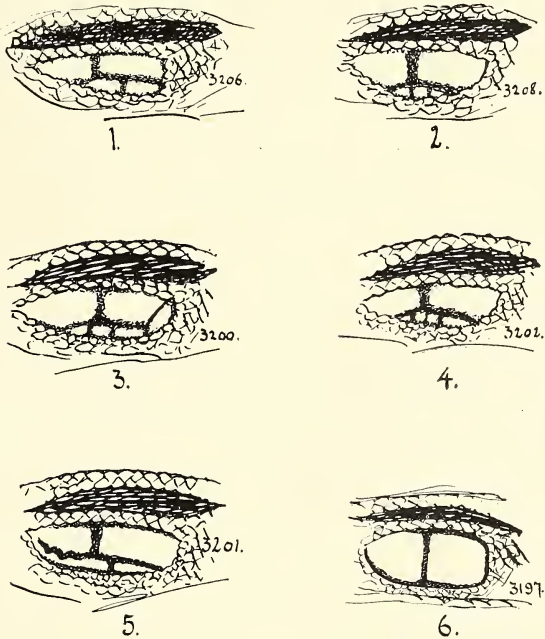
is absent in *undata*: (3) the two transparent scales of *undata* are appreciably larger than the transparent disc in *inornata*.

In one specimen the skin on each side of the throat is loosely expanded; it was noticed that this was the case in life.

E. undata, Smith.

E. undata, Smith, Ill. Rept. Pl. 44, fig. 1: Bouleng., l. c. p. 92: Werner, Rept. Amph. Schultzes Reise, p. 331.

3 examples from the Namib Desert, at Lüderitzbucht. Nos. 3196-3198.



Text fig. 16. Figures 1 to 5 of *Eremias inornata* from the Great Karas Mountains.
Fig. 6 of *Eremias undata* from Lüderitzbucht. (Somewhat diagrammatic.)

E. lineo-ocellata, D. B., geogr. var. *pulchella*, Gray.

E. pulchella: Bouleng., l. c. p. 93: Hewitt, Ann. Transv. Mus., II, 1910, pp. 106, 109, and 113, and III, 1911, p. 48; Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 156.

46 examples from the Great Karas Mountains and vicinity, and from Quibis. Localities: 3209, 3219-3246, Quibis; 3210-3218, Narudas Süd; 3247, 3248, between Groendoorn and Wasserfall in the Little Karas Mountains; 3249, Baviaanspoort (between Kraikluft and Sandmünd); 3250, 3251, in the plains between Groendoorn and Wasserfall; 3252, 3253, Nakeis (mine near Klein Karas Station); 3254, Alt Wasserfall.

The colour is variable: those taken at Quibis usually with green black-edged ocelli dorso-laterally, the dorsal surface being normally light chestnut brown but sometimes with a tinge of yellow or grey: an orange line of varying length almost always present passing from the commissure of the mouth to a point just above the shoulder, becoming somewhat broken along the flanks, and continued behind the thigh for a short distance along the tail. Some were straw-coloured above, others bright chestnut brown.

Genus SCAPTEIRA, Wiegman.

Boulenger, B. M. Cat. III, p. 107.

S. depressa, Merrem.

Boulenger, l. c. p. 110: Werner, Rept. Amph. Schultzes Reise, p. 336.

7 examples from the Namib Desert, and the sandy plains between the Great and Little Karas Mountains. Localities: 3178 (juvenile), Wasserfall; 3263, Lüderitzbucht; 3264–3268, Groendoorn.

In colour the specimens from the two localities differ: those from the Karasberg District are coppery-brown above, that from Lüderitzbucht is greenish. The juvenile individual shows the markings as cited in the Brit. Mus. Cat., but differed in life in so far as the dark stripes were quite black, and slightly broader than the light stripes: these latter were, moreover a light saffron or buff in colour: the limbs were inclined to pink, and the tail was lemon-yellow.

Genus NUCRAS, Gray.

Boulenger, B. M. Cat., III, p. 52.

N. tessellata, Smith.

Boulenger, l. c., and Ann. S. A. Mus., V, 1910, p. 474: Hewitt, Ann. Transv. Mus., II, 1910, p. 107, and III, 1911, p. 48.

4 examples: 3169–3171 at Kraikluft in the Great Karas Mountains at 5000 feet: 3172 between Nakeis and Groendoorn. All agree with the form referred to by Boulenger as *typica*: buff or sand colour above, head and neck darker: on sides dark vertical bars as far as the groin. Largest specimen 243 mm. long of which the tail is 177 mm.

This species was found to frequent sandy places.

Family GERRHOSAURIDAE.

Genus CORDYLOSAURUS, Gray.

Gray, P. Z. S., 1865, p. 641: Boulenger, B. M. Cat. III, p. 126.

C. trivittatus, Pet.

Boulenger, l. c.: Werner, Rept. Batr. Schultzes Reise, 1910, p. 341.

6 examples. 3269–3273 from Quibis; 3274 from Narudas Süd: another individual was also seen at Kraikluft, altitude 5000 feet. They were found under stones usually in rocky or stony localities. They were extremely rapid in their movements and very readily dropped the tail when seized.

The colour of this animal in life is exceedingly rich and beautiful, the effect being very striking in the bright sunshine. A broad jet-black stripe passes from a point just behind the rostral, over the head and back, and along one-half the length of the tail: on each side of this stripe is one which is narrower, pale buff or light ochre on the head and the anterior three-quarters of the back, a brilliant coerulean blue on the hinder part of the back and on the tail. There is also a black lateral stripe on each side. The digits and under parts of the limbs are reddish.*

* I was told by some bastard Hottentots who accompanied us that this animal was greatly valued by them as a remedy against snake bites: at the same time they looked upon the creature as very poisonous (to eat apparently): after some discussion as to the merits of this little animal and of its comparative rarity one of my informants solemnly proposed buying a specimen from me for a sovereign—the usual market price for these things I believe. It was with much reluctance that I had to refuse such a tempting offer.—P.A.M.

An individual of this genus answering to the colour description of *C. subtessellatus*, Smith was seen at Quibis, but unfortunately was not procured. We are of opinion that *subtessellatus* is merely a variety of *trivittatus*, after an examination of a specimen of the former in the Capetown Museum.

Family SCINCIDAE.

Genus MABUIA, Fitzinger.

Boulenger, B. M. Cat., III, p. 150.

M. trivittata, Cuv.

M. trivittata, Boulenger, l. c. p. 195.

M. gruetzneri, Roux, nec Peters, Zool. Jahrb. Syst. 1907, p. 431.

M. kalaharica, Werner, Rept. Amph. Schultzes Reise, p. 350, taf. VIII, fig. 11.

M. varia, Werner, l. c. taf. VIII, fig. 12.

2 examples: 3283, Kraikluft, at 6000 feet, on the top of a mountain; 3285, a juvenile, at Nakeis (Klein Karas).

M. occidentalis, Pet.

Boulenger, l. c. p. 196; Werner, l. c. p. 79; Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 158.

6 examples: 3275–3279 in the dry river-bed at Wasserfall: 3280, a juvenile, in the sandy plains at the foot of the Little Karas Mountains, between Groendoorn and Wasserfall.

Lengths of three specimens, 3279, 87 + 150 mm.: 3277, 91 + 126 mm.: 3275, 98 + 101 mm.

This species was found in burrows under the bushes which grow in the sandy bed of the river, the same burrows often being occupied by scorpions (*Opisthophthalmus* and *Parabuthus*).

It is unusual to find both *occidentalis* and *trivittata* occurring in such close proximity to each other; on the other hand it was noticed that whereas the former preferred sandy soil, the latter sought rocky and stony ground for its retreat.

M. varia, Pet.

Boulenger, l. c. p. 202, and Ann. S. A. Mus. V, 1910, p. 485.

11 examples from various places. Localities: 3284, 3291, 3292, Kraikluft, at 5100 feet: 3286, Nakeis (Klein Karas): 3287, Groendoorn: 3288, 3289, Lüderitzbucht: 3290, 3293–3295, Narudas Süd.

Our specimens differ somewhat from those known to us from the Transvaal and the eastern parts of South Africa, but agree with the form which was referred to by Mr. Boulenger (Annals S. A. Museum) as *M. hildebrandti*: through the courtesy of the Director of the South African Museum, Dr. Péringuey, we have been able to make a careful examination of the actual specimens upon which that determination was made.

Mr. Boulenger endeavours in his key to separate this form from *M. varia* through the relative proportions of the hind limb and the body. If it be true that the Karasberg form does in the main differ from the Transvaal form in this respect, though we have specimens from the Zoutpansberg District which on this character alone might be referred to either species. Further, in examples of *M. varia* from the Karroo we meet with intermediate conditions.

At the same time we can point to another differentiating character probably of much greater importance, namely that of the ear-lobules.

The Karasberg form has long lanceolate lobules, whereas those from the Transvaal have lobules which are short and relatively inconspicuous. Now, all our specimens from the Karroo localities, namely from Steytlerville, Victoria West, Middelburg (C.P.), Klerksdale (near Middelburg), Cradock, and Steinkopf, agree in the character just cited with our Karasberg form, whereas they differ in that the hind limbs are somewhat shorter.

Although that of the ear-lobules is the only structural character which can be utilized as far as we can see, it may be noted that there is some difference in colouration: in the Transvaal form the light lateral streak is white and sharply defined, while in specimens from the Karasbergen and the Karroo it is either absent or comparatively inconspicuous. And further, all our specimens from the Karasbergen and the Karroo have the hind limbs, the inguinal region, and the base of the tail (below and at sides) brick-red in colour. We cannot, however, attach much importance to these colour characters, since the white lateral streak is not conspicuous in Serowe specimens, and the red colouration of the hind limbs appears in an example from Pirie, both these forms being referable to the variety characterized by the possession of short ear-lobules.

We are not inclined to regard the two forms as specifically distinct, but we are prepared to recognize two varieties, distinguished by the length of the ear-lobules.

M. varia, Pet. var. nov. *longiloba*.

The form with short ear-lobules we regard as the typical form: for the form with long ear-lobules we are applying a new name, *M. varia* var. *longiloba*, as we do not think that it can be precisely identical with the form described by Peters under the name of *M. hildebrandti*, judging from Peters' figure and the British Museum Catalogue description: compare the relationship of the loreal to the upper labial: the size of the second supra-ocular as compared with the first: the relation of the parietal shields to each other.

We may note that Mr. Boulenger in Ann. S. A. Mus., V, 1910, p. 485, records *M. varia* from various localities in Little Namaqualand and in the Karroo: it is most probable that these specimens belong to the form with long ear-lobules, that is to say to the same form which he referred to *M. hildebrandti* in the same paper. Sternfeld appears to have followed Werner and Boulenger (*vide* Mitt. Zool. Mus. Berlin, III, 1911, pp. 406 and 408, and in Fauna Deuts. Kol. R. 4: D. S. W. A. H. 2, 1911, p. 39-40: in the latter paper the author made use of the character of the length of the hind limb to the body in separating the two forms) in his identification and diagnosis of the two supposed species.

M. sulcata, Pet.

M. sulcata: Bouleng., l. c. p. 206; and Ann. S. A. Mus. V, 1910, p. 486; Werner, l. c. p. 345; Hewitt, Ann. Transv. Mus. II, 1910, pp. 94 and 100; Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 158.

23 examples from various localities. 3282, 3302, 3309, Kraikluft (5000 to 5200 feet); 3296, 3297, 3308, 3308a, 3311-3317, Narudas Süd; 3298, 3299, Lüderitzbucht; 3300, 3301, 3305, Wasserfall; 3303, 3304, Nakeis (Klein Karas); 3306, Aus; 3307, Quibis; 3310, between Kraikluft and Alt Wasserfall.

A number of juveniles were taken in the Great Karas Mountains: the dorsal pattern in all these is constant and distinctive, there being on the back five light buff streaks and four somewhat broader black streaks,

besides a black lateral line passing from the eye over the ear to a point about half way along the tail: and below this last another light streak from the rostral along the upper lip below the eye through the ear to the tail.

This animal was frequently found in rocky places and was observed to be partly arboreal.

M. acutilabris, Pet.

Bouleng., l. c. p. 208: and Ann. S. A. Mus. V. 1910, p. 486: Werner, l. c. p. 319.

A single specimen, No. 3281, from the dry river-bed at Wasserfall below the Great Karas Mountains. Length, 58 + 102 mm.

Genus SCELOTES, Fitzing.

Bouleng., B. M. Cat. III, p. 408.

S. capensis, Smith.

Gongylus capensis, Smith, Ill. Rept., App. p. 10.

S. capensis, Bouleng., l. c., p. 412, pl. 39, fig. 12: Werner, Rept. Amph. Schultzes Reise, 1910, p. 350.

2 examples, one from under a stone, the other from earth mould lodged in crevices of rocks, in the mountains at Narudas Süd; altitude about 4800 feet. Nos. 3318, and 3319.

Colour olive-brown above, every scale with a dark spot at the base: a light dorso-lateral streak: flanks darker: tail bluish: lower surfaces grey, each scale dirty white with a dark spot: chin and throat almost white.

Length of largest specimen 47 + 29 mm.: in both cases the tail has been regenerated and is considerably shorter than the body.

Family CHAMAELEONTIDAE.

Genus CHAMAELEON, Laur.

Bouleng., B. M. Cat. III, p. 438.

C. namaquensis, Smith.

Bouleng., l. c. p. 462: Werner, Zool. Jahrb. Syst. XV, 1902, p. 369, Taf. 16, and "Das Tierreich," 27, Chamaeleontidae, 1911, p. 40.

2 examples, on the higher plateau, between Kraikluft and Alt Wasserfall. One was found crossing a road, and the other perched on the top of a bush. It did not appear to be more active on the ground than *C. quilensis*.

OPHIDIA.

Family COLUBRIDAE.

AGLYPHAE.

Genus PROSYMNA, Gray.

Bouleng., B. M. Cat. II, p. 246.

P. bergeri, Lindholm.

P. bergeri, Lindholm, Jahrb. Nassau. Ver. 55, 1902, p. 57: Bouleng. Ann. S. A. Mus. V. 1910, p. 509.

A single example (2000) at Narudas Süd, in the mountains, at about 4800 feet.

Ventrals 185, caudals in 36 rows.

Colour above light chestnut-brown, with mosaic pattern of lighter and darker scales which are for the most part dark-edged. Behind the head a broad black collar. Below light brown. The first lower labials form a suture with each other: four pairs of labials are in contact with the gulars, of which the anterior are considerably larger than the posterior. Labials $\frac{7}{5}$.

OPISTHOGLYPHAE.

Genus RHAMPHIOPHIS, Pet.

Bouleng., B. M. Cat. III, p. 144.

R. multimaculatus, Smith.

Coronella multimaculata, Smith, II. Rept. Pl. 61.

R. multimaculata, Bouleng., l. c. p. 148: Sternfeld, Mitt. Zool. Mus. Berlin, 1910, p. 58: Werner. Rept. Amph. Schultzes Reise, 1910, p. 359: Hewitt and Power, Trans. R. S. S. A. III, 1913, p. 166.

A single example, 2001, in the dry river-bed at Wasserfall. Ventrals 160, caudals in 37 rows. Colour above pale mottled olive: in life some of the scales were tinged with blue. Below white. The characteristic horse-shoe shaped marking on the back of the head is present. The prae-ocular is single on one side, divided below on the other. The posterior gulars are separated by five elongate scales which are arranged in two rows. Labials $\frac{8}{5}$. Length, 266 mm. + 38 mm.

Genus PSAMMOPHIS, Boie.

Bouleng., B. M. Cat. III, p. 152.

P. notostictus, Pet.

Bouleng., l. c. p. 156, and Ann. S. A. Mus. V, 1910, p. 513: Werner, Rept. Amph. Schultzes Reise, 1910, p. 360: Hewitt, Rec. Albany Mus. II, p. 268.

9 examples, from the Great Karas Mountains and district. Localities: 2002-2005, Narudas Süd; 2006, Groendoorn; 2007, in the Little Karas Mountains, between Groendoorn and Wasserfall; 2008, 2009, Wasserfall; 2010, Sandmund.

This snake prefers sandy soil for its habitat and is to some extent a tree-climber: in its movements it is exceedingly swift. Locally this creature is known as the "whip snake."

In 2008 the prae-ocular is single on both sides. In our specimens the upper labials are constantly 8 in number, while the lower labials number 8 or 9.

PROTEROGLYPHAE.

Genus NAIA, Laur.

Bouleng., B. M. Cat. III, p. 372.

N. nigricollis, Reihn.

Bouleng., l. c. p. 378: Werner, Rept. Amph. Schultzes Reise, 1910, p. 364.

A single example at Narudas Süd, 2011. This specimen was killed in the military fortifications of this place by the Sergeant in charge who kindly presented it to us. Though this is the most southern record known to us from the western parts of South Africa, we have reason to suppose from information received on the trip that this snake occurs commonly enough further south in the vicinity of Warmbad, Ukamas, etc. It is known locally by the German soldiers as the

“schwarze momba.” Our specimen is black in colour. Length, 1280 mm. of which the tail occupies 245 mm.: 225 ventrals, caudals in 70 rows. This black form we have never seen previously in South Africa but it may be noted that according to Smith a black variety of *Naia laie* occurs in the subcontinent.

Family VIPERIDAE.

Genus BITIS, Gray.

Bouleng., B. M. Cat. III, p. 492.

B. caudalis, Smith.

Vipera caudalis, Smith, Ill. Rept. Pl. vii.

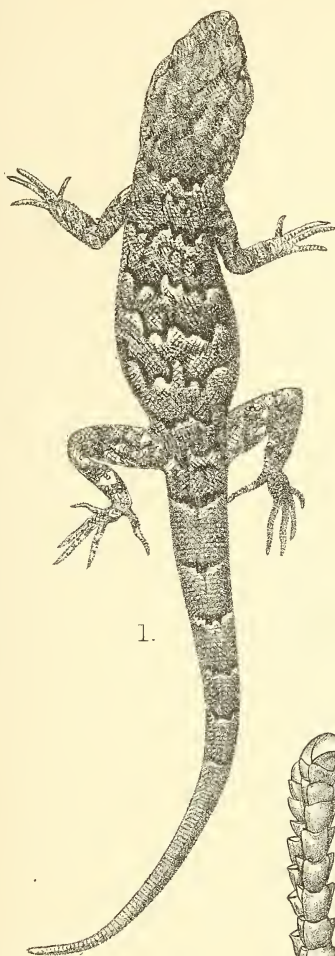
B. caudalis, Bouleng., l. c. p. 498: Werner, Rept. Amph. Schultzes Reise, 1910, p. 367.

33 specimens, of which 12 are embryos taken from a single specimen, from the Great Karas Mountains and district. Localities: 2012, a large female from Wasserfall; 2013–2015, 2032, also from Wasserfall; 2016–2019, Narudas Süd; 2020–2022, Kraikluft (5000 to 5200 feet); 2023–2027, Sandmund; 2028, Groendoorn; 2029, between Groendoorn and Nakeis; 2030, 2031, Nakeis (Klein Karas).

All our specimens are typical *caudalis*, but in a few cases there may be a small auxiliary horn-like scale at the side of the large pointed scute above the eye. It would seem that this horn may be formed by the coalescence of two enlarged scales. In the very young and in embryos the horn is very ill-developed, and may be indicated by nothing more than a prominence above the eye, the scale which is later to form the horn being only slightly larger and longer than the adjacent scales. The median subcaudals near the vent are smooth or feebly keeled. The development of the keel in our series cannot be correlated with age, the embryos possessing about the same degree of keeling to the subcaudals as the largest individuals.

The colouring is variable. Some of our specimens are chestnut-brown; others are a dark grey-brown; one specimen from Narudas Süd is very beautifully marked with dark brown edged with light yellow, amber, and slate-blue, these markings being continued on to the head in a very distinctive way. The largest example measures 473 mm. in total length, of which the tail is 43 mm.: ventrals 153, caudals in 31 rows: 25 scales round the middle of the body.

It may be added that no specimen of *B. cornuta* was seen on this expedition.



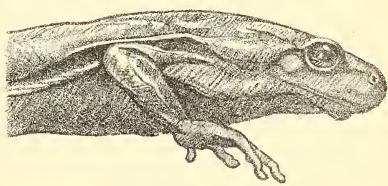
1.



2.



1a.



2a.

P.A.Methuen del.

West, Newman lith.

1. NARUDASIA FESTIVA, *gen. et sp. nov.*
2. PHRYNOMANTIS NASUTA, *sp. nov.*